United States Government **Department of Energy**

memorandum

DATE: January 8, 1997

REPLY TO ATTN OF: EH-53 (R. Sastry, 301-903-4664)

SUBJECT: Chemical Safety Concerns / Search of Occurrence Reporting and Processing System (ORPS)

TO: Distribution

Significant Occurrences

December, 1996

Class 1:

None

Class 2:

Los Alamos - employee exposed to sulfur dioxide

Additional:

At Fernald, an employee was sprayed with slurry during a sampling operation. At Los Alamos, an employee entered a contamination area without proper PPE.

These occurrences are further described below with additional information, including Occurrence Report (OR) numbers, provided in the Attachment.

A search of ORPS for occurrences having chemical safety relevance conducted for the month of December 1996 produced 31 reports representing potential chemical safety concerns. These occurrences are listed in the Attachment. Eleven occurrences were categorized as "Unusual" and the remainder identified as "Off-normal". The Office of Environmental Management (EM) was Cognizant Secretarial Office (CSO) for 14 occurrences; Defense Programs (DP) reported six; Nuclear Energy (NE) had five; and Energy Research (ER) and Uranium Enrichment (UE) three each. This CSO designation may change after the distribution of this monthly memorandum, and this change will be reflected in Quarterly and Annual Reviews.

In order to determine which chemical safety occurrences represent more important (significant) Levels of Concern, a classification scheme has been developed. The definitions of these Classes are as follows:

Class 1 Occurrences characterized by an injury or exposure requiring hospital treatment, or confirmed, severe environmental effect; also occurrences that had the potential to cause these effects with all safety barriers down, except, for example, that no one was nearby to be injured or exposed, or escaped in time, or the climatic conditions were favorable;

Class 2	Occurrences characterized by minor injury (first aid) or exposure, or minor environmental damage; also occurrences that were near misses (where one additional safety barrier remained to prevent consequences) to those in Class 1;
Class 3	Potential precursors to the occurrences in Class 1 or 2;
Class 4	Minor occurrences such as leaks, spills, or releases, which may be significant in their frequency of occurrence though not in their consequences.

There was one Class 2 occurrence reported during December. There were 15 Class 3 occurrences. Among the Class 3 occurrences, in addition to those noted previously, was a cyanide leak from an outdoor waste line at the Kansas City Plant. There was a potential USQ discovered at Pantex in regards to an inadequate safety basis and approval. There were two gas sampler failures at Savannah River in addition to the failure of an off-gas sample pump and the loss of a purge gas compressor. There were several UF6 releases at Paducah and Portsmouth Gaseous Diffusion Plants.

Summary of Class 2 Occurrence:

Worker Exposed to Sulfur Dioxide (DP): (ALO-LA-LANL-FIRNGHELAB-1996-0011) On December 10, 1996, it was determined that an incident that occurred on November 25 was a reportable event. Subsequent health risk calculations indicated the potential for exposure to sulfur dioxide. Estimated time-weighted average (TWA) from a worst case construct is about 12 parts per million (ppm). According to the occurrence report, this TWA would exceed the ACGIH short term exposure limit (STEL) of 5 ppm, and the threshold limit value (TLV) of 2 ppm. During the disinfection and dechlorination of an 8-inch pipeline, a large orange cloud of gas escaped and enveloped a construction employee. The employee stated that his lungs hurt; he immediately exited the room for fresh air, coughed a while, and felt better. The employee notified his direct supervisor, but since he felt better, decided that he did not need to report to LANL's Occupational Medicine Group. The incident was not reported outside of the construction subcontractor. Calcium hypochlorite (HTH) and sodium thiosulfate were used for this process. HTH powder was placed in each joint of pipe and the pipe filled with water. The weather was cold, and subsequent discussions indicated a concern that collectively, the powder and the cold weather could slow down the HTH dissolution. Chlorine levels were monitored and elevated levels indicated that the HTH had not completely dissolved. Personnel requested speeding up the neutralization by adding dissolved thiosulfate to the upper end of the system. The employee involved subsequently reported that a rapid release of gas occurred when he added about one pound of thiosulfate (Na2S203.5H20 prismatic rice) dissolved in several gallons of water into the upstream end of the pipe.

It is recommended that DOE and contractors review an OSHA Hazard Information Bulletin (HIB) having specific relevance to this type of occurrence. The specific HIB (from 1996) is titled Chemical Exposures from Industrial Valve and Piping Systems and may be found on the OSHA Internet site at http://www.osha.gov/oshdocs/. Also note that another OSHA HIB, Water-Reactive Chemicals, Hazardous Materials not Covered Under 29 CFR 1910.119, was reviewed in Operational Experience Weekly Summary, 96-52. This HIB also merits attention by DOE and contractor personnel involved in the use of reactive chemicals at DOE facilities.

Additional information regarding this occurrence and others will be discussed in an upcoming Quarterly Review. As occurrence reports are finalized, lessons learned will be communicated.

[Signature of]

Rama Sastry
Office of Field Support

Attachment

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